

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS

1.-20. (cancelled)

21. (currently amended) A method of forming a thin film on a substrate, comprising:

providing the substrate in a chamber;

forming an oxide coating on the substrate in the chamber;

inserting a composite comprising a porous carrier and a polyhedral oligomeric silsesquioxane amphiphilic material into the chamber, wherein the porous carrier comprises a metal and comprises pores having an average pore size from about 1 micron to about 1,000 microns;

in the chamber, setting at least one of a temperature of the composite from about 20 to about 400° C. and a pressure from about 0.000001 to about 760 torr to induce vaporization of the polyhedral oligomeric silsesquioxane POSS amphiphilic material; and

recovering the substrate having the thin film thereon.

22. (previously presented) The method of claim 21, wherein the polyhedral oligomeric silsesquioxane amphiphilic material comprises at least one selected from the group consisting of poly(p-hydroxybenzylsilsesquioxane); poly(p-hydroxybenzylsilsesquioxane-co-methoxybenzylsilsesquioxane); poly(p-hydroxybenzylsilsesquioxane-co-t-butylsilsesquioxane); poly(p-hydroxybenzylsilsesquioxane-co-cyclohexylsilsesquioxane); poly(p-hydroxybenzylsilsesquioxane-co-phenylsilsesquioxane); poly(p-

hydroxybenzylsilsesquioxane-co-bicycloheptylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-p-hydroxy- α -methylbenzylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-methoxybenzylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-t-butylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-cyclohexylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-phenylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-bicycloheptylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-p-hydroxybenzylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-methoxybenzylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-t-butylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-cyclohexylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-phenylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-bicycloheptylsilsesquioxane); and poly(p-hydroxybenzylsilsesquioxane-co-p-hydroxyphenylethylsilsesquioxane).

23. (previously presented) The method of claim 21, wherein the thin film is formed at a rate from about 0.05 nm/sec to about 0.5 nm/sec.

24. (previously presented) The method of claim 21, wherein the metal comprises at least one selected from the group consisting of aluminum, brass, bronze, chromium, copper, gold, iron, nickel, palladium, platinum, silver, stainless steel, tin, titanium, tungsten, zinc, and zirconium.

25. (previously presented) The method of claim 21, wherein the composite further comprises at least one of a non-polar organic solvent, a film forming catalyst, and a quencher.

26.-30. (cancelled)

31. (previously presented) A method of forming a thin film on a substrate, comprising:

providing the substrate in a chamber;

forming an oxide coating on the substrate in the chamber;

inserting a composite comprising a porous carrier and a polyhedral oligomeric silsesquioxane amphiphilic material into the chamber, wherein the porous carrier comprises at least one metal selected from the group consisting of aluminum, brass, bronze, chromium, gold, iron, nickel, palladium, platinum, silver, stainless steel, tin, titanium, tungsten, zinc, and zirconium and the porous carrier comprises pores having an average pore size from about 1 micron to about 1,000 microns;

in the chamber, setting at least one of a temperature of the composite from about 20 to about 400° C. and a pressure from about 0.000001 to about 760 torr to induce vaporization of the polyhedral oligomeric silsesquioxane amphiphilic material; and

recovering the substrate having the thin film thereon.

32. (previously presented) The method of claim 31, wherein the thin film is formed at a rate from about 0.01 nm/sec to about 1 nm/sec.

33. (new) The method of claim 21, wherein the substrate comprises at least one of a glass, a glass having an antireflection coating thereon, silica, germanium oxide, a ceramic, porcelain, fiberglass, a metal, a thermoset, and a thermoplastic.

34. (new) The method of claim 21, wherein the porous carrier comprises pores having an average pore size from about 5 microns to about 500 microns.

35. (new) The method of claim 21, wherein the porous carrier has a porosity so that it absorbs from about 0.001 g to about 5 g of polyhedral oligomeric silsesquioxane amphiphilic material per cm³ of porous carrier.

36. (new) The method of claim 21, wherein after setting at least one of the temperature and the pressure, keeping the substrate in the chamber for a time from about 10 seconds to about 24 hours.

37. (new) The method of claim 21, wherein the pressure is set prior to setting the temperature.

38. (new) The method of claim 21, wherein the temperature is set from about 40 to about 350° C and the pressure is set from about 0.00001 to about 200 torr.

39. (new) The method of claim 21, wherein the thin film has a thickness from about 1 nm to about 250 nm.

40. (new) The method of claim 21, wherein the polyhedral oligomeric silsesquioxane amphiphilic material comprises reactive hydroxyl groups.

41. (new) The method of claim 31, wherein the substrate comprises at least one of a glass, a glass having an antireflection coating thereon, silica, germanium oxide, a ceramic, porcelain, fiberglass, a metal, a thermoset, and a thermoplastic.

42. (new) The method of claim 31, wherein the porous carrier comprises pores having an average pore size from about 5 microns to about 500 microns.

43. (new) The method of claim 31, wherein the porous carrier has a porosity so that it absorbs from about 0.001 g to about 5 g of polyhedral oligomeric silsesquioxane amphiphilic material per cm³ of porous carrier.

44. (new) The method of claim 31, wherein after setting at least one of the temperature and the pressure, keeping the substrate in the chamber for a time from about 10 seconds to about 24 hours.

45. (new) The method of claim 31, wherein the pressure is set prior to setting the temperature.

46. (new) The method of claim 31, wherein the temperature is set from about 40 to about 350° C and the pressure is set from about 0.00001 to about 200 torr.

47. (new) The method of claim 31, wherein the thin film has a thickness from about 1 nm to about 250 nm.

48. (new) The method of claim 31, wherein the polyhedral oligomeric silsesquioxane amphiphilic material comprises at least one selected from the group consisting of poly(p-hydroxybenzylsilsesquioxane); poly(p-hydroxybenzylsilsesquioxane-co-methoxybenzylsilsesquioxane); poly(p-hydroxybenzylsilsesquioxane-co-t-butylsilsesquioxane); poly(p-hydroxybenzylsilsesquioxane-co-cyclohexylsilsesquioxane); poly(p-hydroxybenzylsilsesquioxane-co-phenylsilsesquioxane); poly(p-hydroxybenzylsilsesquioxane-co-bicycloheptylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-p-hydroxy- α -methylbenzylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-methoxybenzylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-t-butylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-cyclohexylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-phenylsilsesquioxane); poly(p-hydroxyphenylethylsilsesquioxane-co-bicycloheptylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-p-hydroxybenzylsilsesquioxane); poly(p-

hydroxy- α -methylbenzylsilsesquioxane-co-methoxybenzylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-t-butylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-cyclohexylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-phenylsilsesquioxane); poly(p-hydroxy- α -methylbenzylsilsesquioxane-co-bicycloheptylsilsesquioxane); and poly(p-hydroxybenzylsilsesquioxane-co-p-hydroxyphenylethylsilsesquioxane).